

Researchers make less carcinogenic cigarette

January 3 2012, By Anne Ju

(Medical Xpress) -- Though emphasizing that quitting is the best remedy to combat health problems for smokers, Cornell researchers have found a way to make cigarettes less toxic.

Researchers from the lab of Jack H. Freed, the Frank and Robert Laughlin Professor of Physical Chemistry, have demonstrated that lycopene and grape seed extract literally stuffed into a conventional cigarette filter drastically lowers the amount of cancer-causing agents passing through.

Their research is published in the Jan. 2 issue of the *Journal of Visualized Experiments* (JoVE).

"The implications of this technique can help reduce the hazardous effects of tobacco smoke," said Boris Dzikovski, research associate and paper co-author.

The Cornell scientists altered filters of normal cigarettes by placing a mixture of grape seed and lycopene treated with activated carbon in the middle. Their experiments focused on gas-phase free radicals, as opposed to other hazardous ingredients such as the solid particles, or tar, contained in cigarettes.

A laboratory machine "smoked" the altered cigarettes, along with conventional ones. The smoke was passed through a spin-trapping solution, and electron spin resonance spectroscopy (ESR) was used to record the spectra of trapped radicals in the smoke samples.

ESR showed that the grape seed and lycopene removed, or scavenged, up to 90 percent of the free radicals that would otherwise have passed through the filter. The researchers point out that these scavenging agents could be obtained in large quantities, for example, from byproducts of the tomato or wine industries.

Scientists have tried to make safer cigarettes in the past. Hemoglobin, which transports oxygen in red blood cells, and activated carbon have been shown to reduce free radicals in smoke by up to 90 percent, but because of the cost, the combination has not been introduced to the market.

The health hazards associated with free radicals in cigarettes are exacerbated by the fact that cigarette smoke is inhaled in high concentrations, Dzikovski added. Inhaling any smoke, such as second-hand smoke, vehicular pollution or industrial waste, has some potentially damaging effects.

"The amount and composition of radicals from different sources can be dramatically different, and the spin-trapping ESR technique is in a unique position to analyze and quantify them," he said.

The research will be the 1,500th article published in the *JoVE*, the only peer-reviewed, PubMed indexed video-journal.

More information: To watch the full video article, please click [here](#).

Provided by Cornell University

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